



Listing of the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Original) A method of broadcasting a message in a wireless communication network having a plurality of communication units including a receiving communication unit having stored therein network topology information including information identifying neighboring communication units forming a first tier of neighbors and information identifying neighboring communication units of the first tier of neighbors forming a second tier of neighbors, the method comprising:

receiving the message at the receiving communication unit; and
determining, based on the network topology information, whether to retransmit the message based on whether the neighbors of the receiving communication unit are also neighbors of another one of the plurality of communication units.

2. (Original) The method of claim 1, wherein said determining whether to retransmit the message comprises determining not to retransmit the message if another communication unit among the plurality of communication units is configured to broadcast messages to a set of communication units that includes the first tier neighbors of the receiving communication unit and at least one other communication unit that is not a neighbor of the receiving communication unit.

3. (Original) The method of claim 1, wherein said network topology information includes status information indicating whether the first tier communication units serve as one of a member, a cluster-head, and a gateway unit; and wherein the receiving communication unit determines that no communication unit identified within the network topology information is configured to transmit a message to a superset of communication units that includes the first tier neighbors of the receiving communication unit and at least one other communication unit that is not a neighbor of the receiving communication unit, the method further comprising:

determining if the receiving communication unit is an articulation point; and
retransmitting the message if the receiving communication unit is determined to be an articulation point.

4. (Original) The method of claim 3, wherein the receiving communication unit is determined to be an articulation point if the first tier neighbors of the receiving communication unit cannot be divided into subsets such that the members of each subset are first tier neighbors to one of a cluster-head and a gateway communication unit.

5. (Previously Presented) The method of claim 3, wherein N_k is a number of neighbor communications units to which the receiving communication unit is configured to transmit a message; and wherein said determining whether the receiving communication node is an articulation point comprises:

identifying for a neighbor of the receiving communication unit the number of communication units C_m to which the receiving communication unit and the neighbor communication unit can both transmit messages;

calculating for said neighbor of the receiving communication unit a percentage $P_q = C_m / N_k$ of the receiving communication unit's neighbors to which a neighbor communication unit can transmit a message;

determining if the percentage P_q for said neighbor is a maximum value from amongst the neighbors of the receiving communication unit;

calculating a difference d_q between a total number of neighbors of a communication unit having a maximum value of P_q and a total number of the receiving communication unit's neighbors N_k ;

wherein the receiving communication unit is determined not to be an articulation point if P_q of the receiving communication unit is greater than 85% and $0 < d_q < 3$ and said node having a maximum value of P_q is one of a cluster-head and gateway communication unit.

6. (Original) The method of claim 1, wherein said determining whether to retransmit includes using a predetermined algorithm to determine if one or more communication units identified within the network topology information are configured to broadcast a message to each of the receiving communication unit's first tier neighbors and no communication unit identified within the network topology information is configured to broadcast a message to a set of communication units that includes each of the receiving communication unit's first tier neighbors and at least one other communication unit that is not a neighbor of the receiving communication unit.

7. (Original) The method of claim 6, wherein a plurality of communication units are each connected to one or more communication links, and the predetermined algorithm determines whether the receiving communication unit is connected to a greatest number of links with a quality exceeding a threshold from among said one or more communication units configured to broadcast a message to each of the receiving communication unit's first tier neighbors.

8. (Original) The method of claim 6, wherein the predetermined algorithm determines if the receiving communication unit has a fewest number of hops to a gateway unit from among said one or more communication units configured to broadcast a message to each of the receiving communication units first tier neighbors.

9. (Original) The method of claim 6, wherein each of the plurality of communication units has a unique identifier and the predetermined algorithm determines to retransmit the message based upon communication unit unique identifiers.

10. (Original) The method of claim 9, wherein the predetermined algorithm determines to retransmit the message if the receiving communication unit has a smallest unique unit identifier among the communication units configured to broadcast a message to each of the receiving communication unit's first tier neighbors.

11. (Original) The method of claim 9, wherein the predetermined algorithm determines to retransmit the message if the receiving communication unit has a largest unique unit identifier among the communication units configured to broadcast a message to each of the receiving communication unit's first tier neighbors.

12. (Currently Amended) The method of claim 1, wherein a group of communication units among the plurality of communication units is assigned a first island cluster identifier and the receiving communication unit is assigned a cluster head second island identifier, wherein the receiving communication unit transmits the message to the group of communication units if the first cluster identifier has an affiliation with the cluster head identifier and second island identifiers match.

13. (Previously Presented) A method of transmitting a message to a destination communication unit within a wireless communication network having a plurality of communication units including an upper layer communication unit having stored therein routing information for routing to the plurality of communication units in the network, and a receiving communication unit having stored therein network topology information including identifiers of neighboring communication units from which the receiving communication unit has received a message forming a first tier of neighbors, and identifiers of communication units from which the first tier neighbor communication units have received messages forming a second tier of neighbors, the method comprising:

receiving at the receiving communication unit a message destined for a destination communication unit;

determining whether a direct path to the destination communication unit can be identified based on the network topology information stored within the receiving communication unit;

transmitting the message from the receiving communication unit to a next hop communication unit according to the identified path to the destination communication unit if said path is identified, transmitting to an upper layer communication unit if said path can not be identified, and transmitting the message using a flooded message broadcast if said next hop communication unit is determined to no longer be a neighbor of the receiving communication unit.

14. (Original) The method of claim 13, wherein the message is transmitted using controlled flood techniques if no path to said destination communication unit is identified and the receiving communication unit is not associated with an upper layer communication unit.

15. (Currently Amended) The method of claim 13, wherein in determining a path to the destination communication unit, the destination communication unit is determined to be located within a predetermined number of hops from the receiving communication unit.

16. (Previously Presented) The method of claim 15, wherein the predetermined number of hops is two.

17. (Original) The method of claim 13, wherein the message received by the receiving communication unit is received from a traffic source unit internal to the receiving communication unit.

18. (Original) The method of claim 13, wherein determining a path to the destination communication unit further includes:

searching a routing table, stored within the receiving communication unit, containing routes to destination communication units.

19. (Original) The method of claim 13, wherein determining a path to the destination communication unit further includes:

searching a link cache, stored within the receiving communication unit, containing routes to destination communication units.

20. (Original) The method of claim 13, wherein if a direct path is determined based upon network topology information, the cost of routing the message via the direct path is compared with the cost of routing the message through a gateway node, and the next hop communication unit is selected based upon the result of said comparing of routing costs.

21. (Original) The method of claim 13, wherein the upper layer communication unit is a cluster-head communication unit.

22. (Original) The method of claim 13, wherein the upper layer communication unit is a gateway communication unit.

23. (Original) The method of claim 13, wherein receiving communication unit includes an island identifier, and the receiving communication unit detects an island identifier in the message and processes that message only if the island identifier of the message matches the island identifier of the receiving communication unit.

24. (Original) The method of claim 13, wherein if the size of the message exceeds a predetermined threshold the receiving communication unit outputs a probe request using a flooded

message broadcast to detect a route to the destination node, and the receiving communication unit transmits the message based on the route detected using the probe request.

25. (Original) The method of claim 13, wherein if the size of the message exceeds a predetermined threshold the receiving communication unit outputs a probe request using a controlled flood broadcast to detect a route to the destination node, and the receiving communication unit transmits the message based on the route detected using the probe request.

26. (Original) The method of claim 13, wherein the message is transmitted using a flooded message broadcast if the transmission to said next hop communication unit fails.

27. (Original) The method of claim 13, wherein the message is transmitted using a controlled flood broadcast of the message if the transmission to said next hop communication unit fails.

28 -38. (Canceled)

39. (Previously Presented) A communication unit suitable for use in a communication network of a plurality of communication units, the communication unit comprising:

a network topology storage unit having stored therein network topology information including identifiers of neighboring communication units forming a first tier of neighbors and neighbor sets identifying neighbors of the first tier neighbors forming a second tier of neighbors; and

a message forwarding unit configured to forward a multicast message using a controlled flood broadcast technique and to forward a unicast message to a destination communication unit using a unicast technique if the network topology information stored in the storage unit includes information identifying a next hop in a route between the communication unit and the destination unit and using a controlled flood technique if the next hop is determined to no longer be a neighbor of the communication unit.

40. (Original) The communication unit of claim 39, further comprising a dynamic network maintenance module configured to revise the network topology information stored in the storage unit in response to receiving beacon information from a neighboring communication unit.

41. (Original) The communication unit of claim 40, wherein the dynamic network maintenance module periodically selects a gateway for routing messages based on the network topology information in the storage unit.

42. (Previously Presented) The communication unit of claim 41, wherein the communication unit is a radio communication device and the communication network is an ad-hoc network of radio communication devices.